

WHAT IS CLAIMED IS:

1. A transgenic rice, corn, barley or wheat plant, comprising
a heterologous nucleic acid coding sequence for a plant transcription factor operably
5 linked to a seed specific promoter, wherein expression of the transcription factor in the seeds of
said plant is effective to activate transcription of a gene operably linked to a promoter with which
said transcription factor interacts.
2. The transgenic plant of claim 1, wherein said transcription factor is selected from the
10 group consisting of opaque 2 (O2), prolamin box factor (PBF), and the rice endosperm bZIP
protein (Reb).
3. The transgenic plant of claim 2, wherein the promoter with which said transcription
factor interacts is derived from the same species as the rice, corn, barley or wheat plant in which
15 it is expressed.
4. The transgenic plant of claim 2, wherein the promoter with which said transcription
factor interacts is derived from a species different from the rice, corn, barley or wheat plant in
which it is expressed.
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5. The transgenic plant of claim 2, wherein the seed specific promoter is a native seed-
specific promoter, and the transcription factor activates said seed specific promoter.
6. The transgenic plant of claim 2, wherein said transcription factor is expressed under
25 the control of two or more different seed-specific promoters.
7. The transgenic plant of claim 2, wherein said seed-specific promoter is selected from
the group consisting of the Gt1, Glb, Bx7, RP6 and PG5a promoters, having the sequence
presented as SEQ ID NO:26, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:27 and SEQ ID
30 NO:28, respectively.
8. The transgenic plant of claim 5, wherein said transcription factor is expressed in two
or more different seed tissues.
- 35 9. The transgenic plant of claim 2, further comprising a selected heterologous protein
coding sequence under the control of a seed-specific promoter that is activated in response to

interaction with said plant transcription factor or the combination of said first transcription factor and second transcription factors.

10. A method of producing a transgenic rice, corn, barley or wheat plant, by crossing a
5 transgenic plant according to Claim 2 with a parental rice, corn, barley or wheat transgenic plant containing a heterologous protein coding sequence under the control of a seed-specific promoter, wherein said transcription factor interacts with said seed-specific promoter and a plant resulting from the cross exhibits enhanced expression of the heterologous protein relative to the parental rice, corn, barley or wheat plant used to make the cross.

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11. A transgenic rice, corn, barley or wheat plant, comprising
a heterologous nucleic acid coding sequence for a first transcription factor under the
control of a first seed specific promoter, and a heterologous nucleic acid coding sequence for a
15 second transcription factor under the control of a second seed-specific promoter, wherein
expression of both transcription factors results in enhanced expression of a nucleic acid coding
sequence expressed under the control of a promoter with which said first and second
transcription factors interact, wherein the level of expression of said nucleic acid coding
sequence is greater than the level of expression detected in a transgenic plant in which one, but
not both of said first or second transcription factors is expressed.

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12. The transgenic plant of claim 11, wherein said first and second transcription factors are selected from the group consisting of opaque 2 (O2), prolamin box factor (PBF), and the rice endosperm bZIP protein (Reb).

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13. The transgenic plant of claim 11, wherein said seed-specific promoter is selected from the group consisting of the Gt1, *Glb*, *Bx7*, *RP6* and *PG5a* promoters, having the sequence presented as SEQ ID NO:26, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:27 and SEQ ID NO:28, respectively.

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14. The transgenic plant of claim 11, further comprising a selected heterologous protein coding sequence under the control of a seed-specific promoter that is activated in response to interaction with said plant transcription factor or the combination of said first transcription factor and second transcription factors.

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15. A method of enhancing the level of expression of a heterologous protein coding sequence in rice, corn, barley or wheat seeds by transforming a rice, corn, barley or wheat plant

with a heterologous nucleic acid construct effective to express a first and second transcription factor under the control of separate seed-specific promoters, wherein the promoter controlling expression of the heterologous protein coding sequence is responsive to the combined effect of said first and second transcription factors.

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16. A method of enhancing the level of expression of a heterologous protein coding sequence in rice, corn, barley or wheat seeds by transforming a rice, corn, barley or wheat plant with a first heterologous nucleic acid construct effective to express a first transcription factor under the control of a first seed-specific promoter and a second heterologous nucleic acid construct effective to express a second transcription factor under the control of a second seed-specific promoter, wherein the promoter controlling expression of the heterologous protein coding sequence is responsive to the combined effect of the first transcription factor and the second transcription factor.

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15 17. A method of producing a transgenic rice, corn, barley or wheat plant, by crossing a transgenic plant according to Claim 11 with a parental rice, corn, barley or wheat transgenic plant containing a heterologous protein coding sequence under the control of a seed-specific promoter, wherein said transcription factor interacts with said seed-specific promoter and a plant resulting from the cross exhibits enhanced expression of the heterologous protein relative to the parental rice, corn, barley or wheat plant used to make the cross.

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18. A method of making a seed-specific promoter responsive to a transcription factor to which it does not respond in its native state, comprising

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(i) determining the native response sequence for the transcription factor;
(ii) providing a heterologous nucleic acid construct comprising a seed specific promoter which does not respond to said transcription factor; and
(iii) inserting the response sequence into said seed specific promoter, resulting in a modified seed specific promoter effective to bind said transcription factor, wherein the binding of the transcription factor to said response sequence results in an increase in the activity of said seed specific promoter.

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19. A modified seed-specific promoter, prepared by the method of claim 18.

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20. A modified seed-specific promoter, comprising the binding sequence for a transcription factor to which said seed specific promoter does not respond in its native state,

wherein the binding of the transcription factor to the modified promoter results in an increase in the activity of said promoter.

21. The modified seed-specific promoter, according to claim 20, wherein said seed-specific promoter is the Gt1 promoter and said transcription factor is Reb.

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22. A transgenic plant comprising a modified seed-specific promoter according to claim 20.

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U.S. PATENT AND TRADEMARK OFFICE
AUGUST 2006